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10/757,490	01/15/2004	Kimberley Moravec	A3265-US-NP XERZ 2 01618	4166

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EXAMINER	
DALEY, CLIFTON G	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/757,490	MORAVEC ET AL.	
	Examiner	Art Unit	
	Clifton G. Daley	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/9/2004, 6/16/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-20 and 22-25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The recited claims include the judicial exception of an abstract idea (determining a foreground color or determining legibility). No physical transformation is present to establish a practical application of the idea. The result (a foreground color or legibility measurement) is useful and concrete, but not tangible.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 5-8 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Guo et al. (Hereinafter "Guo": Ping Guo and Michael R. Lyu, "A Study on Color Space Selection for Determining Image Segmentation and Region Number", Proceedings of the international Conference, IC-AI 2000, CSREA Press, Athens, GA, USA, Vol.3, pp. 1127-1132, June 2000).

Regarding claims 1 and 22, Guo teaches a method and analogous system for automatically determining a foreground color for a digital image, comprising: (a) automatically dividing the colors of the pixels of at least a part of the digital image into a number of color clusters in a color space **(see Abstract)**; and (b) for at least one color cluster, automatically selecting a color being related to the at least one color cluster according to predetermined criteria **(§ 3, ¶ 3)**.

Regarding claim 5, Guo teaches the method according to claim 1, wherein said dividing at (a) comprises converting the image data to a predetermined color format **(§ 2.4, ¶ 2)**.

Regarding claim 6, Guo teaches the method according to claim 1, wherein said dividing at (a) comprises using an Expectation-Maximization clustering **(§ 2.1)**.

Regarding claim 7, Guo teaches the method according to claim 1, wherein said dividing at (a) comprises determining the number of clusters using a model selection method one of a Bayesian Information Criterion and a Universal Model-based Minimum Description Length Principle **(§ 2.3, i.e. Bayesian Probabilistic Classification)**.

Regarding claims 8 and 23, Guo teaches the method and analogous system according to claim 1, further comprising automatically segmenting the part of the digital image into regions according to the color clusters before said selecting at (b) **(§ 1, ¶ 1 and § 3, ¶ 3)**.

Regarding claim 21, Guo teaches the method according to claim 1, further comprising one of displaying and storing a predetermined object using the selected color together with the digital image **(§ 3 and Fig. 1)**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Guo as applied to claim 1 above, in view of Hamlin et al. (Hereinafter "Hamlin": US 5473738), and further in view of Sandow (US 5909220).

Guo teaches the method according to claim 1. Guo does not teach the limitation wherein said selecting at (b) further comprises: selecting a harmonious color set with respect to the color clusters.

However, Hamlin discloses a method wherein said selecting at (b) further comprises: selecting a harmonious color set with respect to the color clusters **(Column 1, lines 9-12)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Hamlin's harmonious color selecting method with Guo's foreground color determining method, the motivation being to produce a pleasing effect to the eye **(Hamlin: column 2, lines 25-27)**.

Guo in combination with Hamlin does not teach the limitation wherein said selecting at (b) further comprises testing the harmonious color set for legibility.

However Sandow discloses a method wherein said selecting at (b) further comprises testing the harmonious color set for legibility **(column 17, lines 25-29)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Sandow's legibility testing method with the above combined teaching of Guo and Hamlin, the motivation being to control the legibility of lettering **(Sandow: Column 3, lines 30-34)**.

6. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo combined with Hamlin and in view of Sandow as applied to claim 2 above, and further in view of You et al. (Hereinafter "You": J. You, E. Pissaloux, H. A. Cohen, "A Hierarchical Image Matching Scheme Based on the Dynamic Detection of Interesting Points", International Conference on Speech and Image Processing, 1995, Vol. 4, pp. 2467-2470).

Regarding claim 3, Guo in combination with Hamlin and in view of Sandow teaches the method according to claim 2, as disclosed above, wherein said testing the harmonious color set for legibility further comprises: computing local measures of contrast between background and foreground in a neighborhood of a predetermined foreground region **(Sandow: column 19, lines 1-8 and Fig. 12, background 65 in a neighborhood of foreground 64)**.

Guo in combination with Hamlin and in view of Sandow does not teach the limitation wherein said testing the harmonious color set for legibility further comprises computing a legibility score representative of a lowest few contrast values observed over the predetermined foreground region.

However, You discloses computing a legibility score representative of a lowest few contrast values observed over the predetermined foreground region **(page 2468, § 2.1 and § 3, ¶ 2, i.e. computing the Hausdorff distance (legibility score) using only the "interesting points" over the foreground region)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine You's computing method with the above combined teaching of Guo, Hamlin and Sandow, the motivation being to decrease computation time **(You: § 3, ¶ 1)**.

Regarding claim 4, Guo in combination with Hamlin and in view of Sandow teaches the method according to claim 2, wherein a color is selected according to a legibility criterion for a predetermined foreground region by: computing local measures of contrast between background and foreground in a neighborhood for a predetermined foreground region **(Sandow: column 19, lines 1-8 and Fig. 12, background 65 in a neighborhood of foreground 64)**.

Guo in combination with Hamlin and in view of Sandow does not teach the limitation of computing a legibility score representative of a lowest few contrast values observed over the predetermined foreground region.

However You discloses computing a legibility score representative of a lowest few contrast values observed over the predetermined foreground region **(page 2468, § 2.1 and § 3, ¶ 2, i.e. computing the Hausdorff distance (legibility score) using only the "interesting points" over the foreground region)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine You's computing method with the above combined teaching of Guo, Hamlin and Sandow, the motivation being to decrease computation time **(You: § 3, ¶ 1)**.

7. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Guo as applied to claim 8 above, in view of Shi et al. (Hereinafter "Shi": Jianbo Shi and Jitendra Malik, "Normalized Cuts and Image Segmentation", 2000, IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 22, No. 8, pp. 888-905).

Guo teaches the method according to claim 8.

Guo does not teach the limitation wherein the segmenting comprises using one of a normalized cut criterion and an energy-minimization method.

However, Shi discloses a segmentation method using one of a normalized cut criterion and an energy-minimization method **(See Abstract)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Shi's criterion with Guo's teaching, the motivation being to measure the goodness of an image segment **(Shi: page 889, left column, lines 6-8)**.

8. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Guo as applied to claim 1 above, in view of Lovelady et al. (Hereinafter "Lovelady": US 5335292).

Guo teaches the method according to claim 1.

Guo does not teach the limitation wherein said selecting at (b) further comprises: grouping the color clusters into interference clusters comprising a pixel in a selected region of the image and benign clusters comprising no pixel in the selected region; and selecting a color being related to all interference clusters according to predetermined criteria.

However, Lovelady discloses a method wherein said selecting at (b) further comprises: grouping the color clusters into interference clusters comprising a pixel in a selected region of the image and benign clusters comprising no pixel in the selected region **(column 13, lines 38-65)**; and selecting a color being related to all interference clusters according to predetermined criteria **(column 13, lines 63-65, i.e. "keeper" color)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Lovelady's grouping method with Guo's segmentation teaching, the motivation being to minimize the interference between colors **(Lovelady: column 13, lines 30-32)**.

9. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Guo as applied to claim 1 above, in view of Sandow.

Guo teaches the method according to claim 1.

Guo does not teach the limitation wherein a color is selected according to a legibility criterion for a predetermined foreground region.

However, Sandow discloses a method wherein a color is selected according to a legibility criterion for a predetermined foreground region **(column 6, lines 55-60)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Sandow's legibility testing method with the above teaching of Guo, the motivation being to control the legibility of lettering **(Sandow: Column 3, lines 30-34)**.

10. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Guo combined with Sandow as applied to claim 11 above, in view of Gatica-Perez (Hereinafter "Gatica-Perez": Daniel Gatica-Perez, Zhi Zhou, Ming-Ting Sun and Vincent Hsu, "Video Object Hyper-Links for Streaming Applications", 2002, Springer-Verlag Berlin Heidelberg, VISUAL 2002, LNCS 2314, pp, 229-238).

Guo in combination with Sandow teaches the method according to claim 11.

Guo in combination with Sandow does not teach the limitation wherein a color is selected based on a likelihood ratio of the hypothesis that the digital image contains the foreground region and the hypothesis that the digital image does not contain the foreground region.

However, Gatica-Perez discloses a method wherein a color is selected based on a likelihood ratio of the hypothesis that the digital image contains the foreground region

and the hypothesis that the digital image does not contain the foreground region **(page 232 and Fig. 2)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Gatica-Perez's color selection method with the above combined teaching of Guo and Sandow, the motivation being to reduce the search space for segmentation **(Gatica-Perez: § 2.3, ¶ 1, lines 1-3)**.

11. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Guo combined with Sandow, in view of Gatica-Perez as applied to claim 12 above, and further in view of You.

Guo in combination with Sandow and further in view of Gatica-Perez teaches the method according claim 12.

Guo in combination with Sandow and further in view of Gatica-Perez does not teach the limitation wherein selecting a color comprises computing the legibility of 11 min x T max y C 2 r(x+y), wherein 12 r (x) = h log Pr (I (x) | T) Pr (I (x) | B) ,C.sub..epsilon..sup.2 is a disc of radius .epsilon and wherein Pr(I(x).vertline.T) denotes heuristic or other models of likelihoods that the image I contains text T at a given pixel x and Pr(I(x).vertline.B) denotes heuristic or other models of likelihoods that the image I contains background B at the given pixel x.

However, You discloses a method wherein selecting a color comprises computing the legibility of 11 min x T max y C 2 r(x+y), wherein 12 r (x) = h log Pr (I (x) | T) Pr (I (x) | B) ,C.sub..epsilon..sup.2 is a disc of radius .epsilon and wherein

Pr(I(x).vertline.T) denotes heuristic or other models of likelihoods that the image I contains text T at a given pixel x and Pr(I(x).vertline.B) denotes heuristic or other models of likelihoods that the image I contains background B at the given pixel x **(page 2468, § 2.1 and § 3, ¶ 2, i.e. computing the Hausdorff distance (legibility score) using only the "interesting points" over the foreground region, and using Gatica-Perez's likelihood ratio disclosure (Gatica-Perez: page 232 and Fig. 2))**.

12. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo as applied to claim 1 above, in view of Hamlin.

Regarding claim 14, Guo teaches the method according to claim 1. Guo does not teach the limitation wherein a color is selected according to a color harmony criterion.

However, Hamlin discloses a method wherein a color is selected according to a color harmony criterion **(Column 1, lines 9-12)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Hamlin's harmonious color selecting method with Guo's foreground color determining method, the motivation being to produce a pleasing effect to the eye **(Hamlin: column 2, lines 25-27)**.

Regarding claim 15, Guo in combination with Hamlin teaches the method according to claim 14, wherein a color is selected according to at least one of a

monotonic, a complementary, and a p-adic color harmony criterion in HSL space **(Hamlin: column 4, lines 25-27)**.

13. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo combined with Hamlin as applied to claim 14 above, in view of Lovelady.

Regarding claim 16, Guo combined with Hamlin teaches the method according to claim 14.

Guo combined with Hamlin does not teach the limitation wherein a color is selected according to a color harmony criterion with respect to at least one interference cluster.

However, Lovelady discloses a method wherein a color is selected according to a color harmony criterion with respect to at least one interference cluster **(column 13, lines 63-65, i.e. "keeper" color)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Lovelady's color selection method with the combined teaching of Guo and Hamlin, the motivation being to minimize the interference between colors **(Lovelady: column 13, lines 30-32)**.

Regarding claim 17, Guo combined with Hamlin teaches the method according to claim 14.

Guo combined with Hamlin does not teach the limitation wherein a color is selected according to a color harmony criterion with respect to at least one benign cluster.

However, Lovelady discloses a method wherein a color is selected according to a color harmony criterion with respect to at least one benign cluster **(column 13, lines 38-65.**

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Lovelady's color selection method with the combined teaching of Guo and Hamlin, the motivation being to minimize the interference between colors **(Lovelady: column 13, lines 30-32)**.

Regarding claim 18, Guo combined with Hamlin teaches the method according to claim 14.

Guo combined with Hamlin does not teach the limitation wherein a color is selected according to a color harmony criterion with respect to at least one interference cluster and at least one benign cluster.

However, Lovelady discloses a method wherein a color is selected according to a color harmony criterion with respect to at least one interference cluster **(column 13, lines 63-65, i.e. "keeper" color)** and at least one benign cluster **(column 13, lines 38-65.**

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Lovelady's color selection method with the combined teaching of Guo and Hamlin, the motivation being to minimize the interference between colors **(Lovelady: column 13, lines 30-32)**.

14. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo as applied to claim 1 above, in view of Hamlin, and further in view of Sandow.

Regarding claim 19, Guo teaches the method according to claim 1. Guo does not teach the limitation wherein said selecting at (b) comprises determining a color subset according to a color harmony criterion and maximizing a legibility function in the color subset.

However, Hamlin discloses a method wherein said selecting at (b) further comprises selecting a harmonious subset according to a color harmony criterion **(Column 7, lines 19-22)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Hamlin's harmonious color selecting method with Guo's foreground color determining method, the motivation being to produce a pleasing effect to the eye **(Hamlin: column 2, lines 25-27)**.

Guo in combination with Hamlin does not teach the limitation wherein said selecting at (b) further comprises maximizing a legibility function in the color subset.

However Sandow discloses a method wherein said selecting at (b) further comprises maximizing a legibility function in the color subset **(column 17, lines 25-29 and column 36, lines 36-49, i.e. selecting color subset for maximum legibility slider value)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Sandow's legibility maximization method with the

above combined teaching of Guo and Hamlin, the motivation being to control the legibility of lettering **(Sandow: Column 3, lines 30-34)**.

Regarding claim 20, Guo combined with Hamlin and Sandow teaches the method according to claim 1 and the harmonious color selection method (i.e. function) and legibility maximization function as recited in claim 19 above.

Guo combined with Hamlin and Sandow does not disclose the limitation wherein a color c is selected for which 13 i = 1 M 1 l (c , P i) + k = 1 N k h (c , K k) is maximal, wherein P.sub.i denote the interference clusters, K.sub.k denote all clusters, both benign and interference, l is a legibility function in color space, h is a color harmony function, and .alpha..sub.i and .gamma..sub.k are weighting factors.

However, the examiner takes official notice that maximizing a weighted sum was notoriously well know in the art at the time of the invention.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to maximize a weighted sum comprising Guo's harmonious color selection function and Sandow's legibility maximization function, the motivation being to combine optimization of a pleasing effect to the eye **(Hamlin: column 2, lines 25-27)** and the legibility of lettering **(Sandow: Column 3, lines 30-34)**.

15. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandow, and further in view of You.

Regarding claim 24, Sandow teaches a method for determining legibility of an image having an identified foreground and background, comprising: computing local

measures of contrast between background and foreground in a neighborhood for a predetermined foreground region of the image **(column 19, lines 1-8 and Fig. 12, background 65 in a neighborhood of foreground 64)**.

Sandow does not teach the limitation of computing a legibility score representative of a lowest few contrast values observed over the predetermined foreground region.

However, You discloses computing a legibility score representative of a lowest few contrast values observed over the predetermined foreground region **(page 2468, § 2.1 and § 3, ¶ 2, i.e. computing the Hausdorff distance (legibility score) using only the "interesting points" over the foreground region)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine You's computing method with Sandow's teaching, the motivation being to decrease computation time **(You: § 3, ¶ 1)**.

Regarding claim 25, Sandow in combination with You teaches the method according to claim 24, wherein the lowest few contrast values observed over the predetermined foreground region is a minimum of all local measures taken over the predetermined foreground region **(page 2468, § 2.1 and § 3, ¶ 2, i.e. computing the Hausdorff distance (legibility score) using only the "interesting points" over the foreground region)**.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wu (US 2002/0027561) discloses color determination. Colmenarez et al. (Antonio J. Colmenarez and Thomas S. Huang, "Face Detection With Information-Based Maximum Discrimination", 1997, IEEE, pp. 782-787) discloses a visual learning application using a likelihood ratio. Sahoo et al. (P. K. Sahoo, S. Soltani, A. K. C. Wong and Y. C. Chen, "A Survey of Thresholding Techniques", 1988, Computer Vision, Graphics and Image Processing, Vol. 41, pp. 233-260) discloses local contrast techniques. Balasubramanian et al. (US 6414690) discloses contrast relationships in local areas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clifton G. Daley whose telephone number is 571-270-3144. The examiner can normally be reached on Monday - Friday 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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